

Remarks

In response to the reopening of the prosecution by the Examiner, applicants are exercising their option to file a reply under 37 CFR 1.111 by filing this amendment.

In this amendment, applicants have cancelled non-elected claims 11-23, 27-33 and 37-43 as requested by the Examiner.

In addition, applicants have amended claim 1 to recite that the use count is compared with a previously read use count, as recited in now cancelled claim 4. If the use count matches the previously read use count, then, "atomically with said comparing step," the use count is updated "to indicate a new count of tasks accessing said message queue" and the use count flag is updated to indicate whether the task has acquired a lock on the queue. Corresponding claims 24 and 34 have been similarly amended.

Claim 4 has been cancelled, as its recitations are now contained in claim 1. Claim 5, formerly dependent on claim 4, has been amended to depend on claim 1. Corresponding claims 25-26 and 35-36 have been similarly cancelled or amended, as the case may be.

Rejection under 35 U.S.C. § 103

Claims 1-10, 24-26 and 34-34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gulick et al. U.S. Patent No. 6,314,501 ("Gulick") (page 3, ¶ 7). This rejection is respectfully traversed.

In applicants' claimed system, as defined for example in claim 1 as amended, a use count is stored indicating a count of tasks accessing a queue, together with a use count flag indicating whether a caller has acquired a lock on the queue. The use count is compared with a previously read use count. If the two match, then, atomically with the comparing step, the use count is updated to indicate a new count of tasks accessing the message queue and the use count flag is updated to indicate whether the task has acquired a lock on the queue.

Gulick discloses, in the context of a partitioned computer system, an input queue area 1914 (Fig. 19) having a common header (Fig. 29) and a number of individual input queues (Fig. 30) corresponding to a number-of-input-queues field of the input queue header. Each individual input queue stores a maximum number of signals as indicated by a maximum-number-of-signals field of the input queue header. Each input queue (Fig. 30) has a lock field 3010, a count field 3012 indicating the number of signals actually stored in a signal entries area 3016 of the queue, and a flag 3014 indicating whether the queue presently contains the maximum permitted number of signals.

Gulick's input queue operates in a conventional manner, as shown in Fig. 31A. To write a signal to an input queue, the writing process obtains a lock on the input queue (step 3124), increments the queue count 3012 (step 3126), writes the signal to the signal entries area 3016 of the queue (step 3128), notifies a waiting process if the queue was previously empty (steps 3130 and 3132), then releases the lock (step 3131 or 3133).

It is clear from this description that Gulick does not store both a use count indicating a count of tasks accessing a message queue and a use count flag indicating whether a caller has acquired a lock on the message queue, as claimed by applicants. Thus, even if one equates Gulick's lock 3010 with applicants' use count flag, there is no teaching of storing a use count of the number of tasks accessing the queue.

The Examiner asserts, however, that it would have been obvious to have applied Gulick's teachings to include indicating a count of tasks, because Gulick's teachings "would have provided an efficient mechanism for transferring messages using a message queue" (page 4). As a relevant "teaching", the Examiner cites Gulick's storing of a count 3012 (Fig. 30) of the number of signals in a queue. However, tracking the number of elements in a queue has its own purposes, such as keeping track of the location of the tail of the queue and determining whether the queue is full. Neither of these purposes would be served by tracking the number of tasks accessing a queue. Nor is it apparent how tracking such a number would serve the purpose of providing "an efficient mechanism for transferring messages using a message queue".

Further, there is no teaching of comparing a use count with a previously read use count, as further claimed by applicants. In rejecting former claim 4, the Examiner points to the paragraph of the Gulick patent bridging columns 36-37. However, in that passage the patentee talks merely of comparing two queue offsets to determine whether a queue is full. Other than the fact that a comparison operation is involved, though, this has nothing in common with the comparison of use counts that is claimed by applicants.

Finally, in the Gulick system, the only operations that are performed atomically are the testing and setting operations¹ that presumably implement the locking and unlocking steps 3124 and 3131 or 3133. The actual updates of both the queue count 3012 and the signal entries area 3016 are performed as separate steps and are not atomically performed either with each other or with the locking and unlocking steps that bracket them.

In summary, Gulick does not teach storing a use count indicating a count of tasks accessing a queue, as claimed by applicants. Further, Gulick does not teach an atomic operation in which such a use count is compared with a previous use count and, if the two match, both the use count and a use count flag are updated, as further claimed by applicants. Accordingly, Gulick neither anticipates nor renders obvious the subject matter of claims 1, 24 and 34 or the claims dependent thereon.

¹ Gulick does not expressly describe how the lock is implemented, but an atomic test-and-set operation (or compare-and-swap operation) is typically used (see Specification, page 11, lines 12-16).

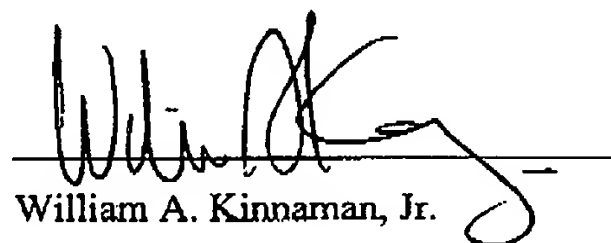
Conclusion

For the foregoing reasons, claims 1-3, 5-10, 24, 26, 34 and 36 as amended distinguish patentably over the art cited by the Examiner.

Reconsideration of the application as amended is respectfully requested. It is hoped that upon such consideration, the Examiner will hold all claims allowable and pass the case to issue at an early date. Such action is earnestly solicited.

Respectfully submitted,
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